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10/525,973	08/25/2005	Jere Kolehmainen	1034382-001	3182

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EXAMINER	
NGUYEN, TRAN N	
ART UNIT	**PAPER NUMBER**
2834	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/525,973	KOLEHMAINEN ET AL.	
	Examiner	Art Unit	
	Tran N. Nguyen	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *06 September 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 and 10-18* is/are rejected.

7)☒ Claim(s) *8,9,19 and 20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. **Claims 1-7, 10, 11-14, and 15-18** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Wakui et al (US Pub 2002/0171309)** in view of **Asano et al (US 6396374).**

Wakui discloses a rotor structure (1, Fig. 6) with permanent magnets (2) adapted to the rotor pack, the permanent magnets forming a plurality of magnetic poles and being configured to maximize so that the magnetic flux density is at its maximum at the respective centers of the plurality of magnetic poles and decrease the magnetic flux density towards the respective edges of the plurality of magnetic poles, wherein:

each of the plurality of magnetic poles have a first edge and a second edge located close to the outer circumference of the rotor, and there are slots (3) in the rotor on the route of the magnetic flux, so that at least one slot extending from close to the first and second edges essentially towards the center of each of the plurality of magnetic poles, and that the slots are closer to the outer circumference of the rotor than the central axle of the rotor.

One may assert that slots (3) are connected to the first and second edges of respective magnets (2) of the magnetic pole. This allegation would be irrelevant because the claimed language recites *"the permanent magnets forming a plurality of magnetic poles...wherein each*

of the plurality of magnetic poles have a first edge and a second edge located close to the outer circumference of the rotor" (emphasis added).

Notice that the recitation is that each of the plurality of magnetic poles having a first edge and a second edge, but does not specifically reciting that the first and second edges being defined by the plurality of permanent magnets.

Therefore, the claimed language is broadly read that the first edge and a second edge are the rotor core's portions located between the magnets and the outer circumferential periphery of the rotor. Thus, slots (3), as shown in Fig. 6, extending from close to the first and second edges essentially towards the center of each of the plurality of magnetic poles, and that the slots are closer to the outer circumference of the rotor than the central axle of the rotor, as shown in Wakui's Fig. 6.

Wakui also discloses that wherein

the slots (3, Fig. 6) located at a distance from the outer circumference of the rotor (1, Fig. 6);

the permanent magnets (2, Fig. 6) arranged in a V shape so that said magnets extend to the vicinity of the outer circumference of the rotor (1, Fig. 6) and that said magnets forming a single pole are closer to each other at the end towards the axle (4, Fig. 6) than at the end towards the circumference;

the slots (3, Fig. 6) extending from the edge of the pole (2, Fig. 6) towards the center of said pole essentially parallel with the outer circumference of the rotor (1, Fig. 6);

the width of the slot (3, Fig. 6) decreases towards the center of the pole (2, Fig. 6);

the end of the slot (3, Fig. 6) located towards the center of said pole is curved towards the axle (4, Fig. 6);

the slot (3, Fig. 6) extends from the edge of the pole (2, Fig. 6) essentially towards the center of said pole on the outer circumference of the rotor (1, Fig. 6).

Wakui substantially discloses the claimed invention, except for the following: the axle mounted to the machine with bearings, and the rotor pack is made of iron.

Asano, however, teaches a rotor (10, Fig. 1) for a permanent-magnet electrical machine (col. 1, line 12), comprising an axle (14, Fig. 1) mounted to the machine body with bearings (col. 3, lines 44-48) for rotatably supporting the rotor, a rotor pack (11, Fig. 1) made of iron (col. 4, lines 52-53) wherein iron is well-known for high magnetically conducting characteristics.

Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify the rotor by providing the rotor with bearing for mounting the rotor to the machine with the bearings, and selecting iron as material for fabricating the rotor pack, as taught by Asano. Doing would respectively provide bearing means to rotatably support the rotor and its axle in a rotary electrical machine, and enhance the magnetically conductive strength of the rotor since iron is a well-known for high magnetically conducting characteristics.

Regarding the limitations of the magnet being located on the surface of the outer circumference of the rotor, instead of being within the rotor core as disclosed by Wakui, those skilled in the art would realize that re-arranging the magnets is a matter of obvious engineering design choice.

Wakui's rotor having magnets being embedded in the core, this would ensure that the magnets being mechanically support and protected within the core to prevent magnet breakage. However, such arrangement might cost more in term of fabricating because of the process of forming the inserting holes for accommodating the magnets within.

On the contrary, placing magnet on the outer circumferential surface of the rotor, as claimed in the invention, would enhance the magnetic flux flow since the magnets are directly facing the stator, and reduce cost of fabricating process. However, the mechanical support and protection for the magnets against centrifugal force during the rotor rotation would be compromised. Since the magnets being located on the outer circumferential surface of the rotor,

there would be a greater chance that the magnet being broken, and the broken pieces being discard by the centrifugal force causing potential damage to other parts of the machine. Nevertheless, rotors with magnets being located on the outer circumferential surface thereof are well known in the art.

Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify the rotor by re-arranging the rotor so that the magnet being located on the surface of the outer circumference of the rotor. Doing so would enhance the magnetic flux flow since the magnets are directly facing the stator, and reduce cost of fabricating process. Also, such re-arrangement is well known in the art and would require only routine skills in the art.

Regarding the method claimed language, the combination of **Wakui, Asano and Regis** discloses the detailed structural features of the claimed rotor, it would have been obvious to one skilled in the art with the necessary mechanical skills in the art to derive a method of fabricating the disclosed rotor, as of **Wakui, Asano and Regis,** because method of fabricating of the like is a counterpart of the rotor structure. Furthermore, whether the slots are formed by die cutting or laser for drilling is a matter of obvious machinery fabricating choice, each having its own advantage but all there methods for fabricating slots/holes in a rotor core are well known in the art.

2. **Claims 1-7, 10, 11-14, 15-18** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Wakui et al (US Pub 2002/0171309)** in view of **Regis et al (FR2636480)** and **Asano et al (US 6396374).**

Wakui discloses a rotor structure (1, Fig. 6) with slots (3, Fig. 6) in the rotor poles (2, Fig. 6) on the route of the magnetic flux (par. 53, lines 1-5) so that at least one slot (3, Fig. 6) extends from both edges of the pole (2, Fig. 6) essentially towards its center and that said slot is closer to

the outer circumference of the rotor (1, Fig. 6) than the central axle (4, Fig. 6) of said rotor, wherein

the slots (3, Fig. 6) located at a distance from the outer circumference of the rotor (1, Fig. 6);

the permanent magnets (2, Fig. 6) arranged in a V shape so that said magnets extend to the vicinity of the outer circumference of the rotor (1, Fig. 6) and that said magnets forming a single pole are closer to each other at the end towards the axle (4, Fig. 6) than at the end towards the circumference;

the slots (3, Fig. 6) extending from the edge of the pole (2, Fig. 6) towards the center of said pole essentially parallel with the outer circumference of the rotor (1, Fig. 6);

the width of the slot (3, Fig. 6) decreases towards the center of the pole (2, Fig. 6);

the end of the slot (3, Fig. 6) located towards the center of said pole is curved towards the axle (4, Fig. 6);

the slot (3, Fig. 6) extends from the edge of the pole (2, Fig. 6) essentially towards the center of said pole on the outer circumference of the rotor (1, Fig. 6).

Wakui substantially discloses the claimed invention, except for the following:

(a) the axle mounted to the machine with bearings, and the rotor pack is made of iron

(b) the slots are extending from close to the first and second edges of the pair permanent magnets, instead of being connected to the edges of the pair magnets.

Asano, however, teaches a rotor (10, Fig. 1) for a permanent-magnet electrical machine (col. 1, line 12), comprising an axle (14, Fig. 1) mounted to the machine body with bearings (col. 3, lines 44-48) for rotatably supporting the rotor, a rotor pack (11, Fig. 1) made of iron (col. 4, lines 52-53) wherein iron is well-known for high magnetically conducting characteristics.

Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify the rotor by providing the rotor with bearing for mounting the rotor to the

machine with the bearings, and selecting iron as material for fabricating the rotor pack, as taught by Asano. Doing would respectively provide bearing means to rotatably support the rotor and its axle in a rotary electrical machine, and enhance the magnetically conductive strength of the rotor since iron is a well-known for high magnetically conducting characteristics.

Regarding the claimed features of the slots are extending from close to the first and second edges of the pair permanent magnets, instead of being connected to the edges of the pair magnets, **Regis** teaches a rotor having permanent magnets (7, 8) adapted to the rotor pack, the permanent magnets forming a plurality of magnetic poles, wherein:

each of the plurality of magnetic poles have a first edge and a second edge located close to the outer circumference of the rotor (Fig 1), and there are slots (11, 12) are separated from the first and second edges of the magnet poles by a ridge (unnumbered, fig 1), wherein the slots (11, 12) are extending from close to the first and second edges of the pole essentially towards the center of each of the plurality of magnetic poles, the slots are closer to the outer circumference of the rotor than the central axle of the rotor, and the slots (11, 12). Regis teaches that such arrangement of the slots (11, 12) to allow through a maximum of magnetic flux in the vicinity of the plane of symmetry of the pole and to limit the magnetic flux leakage passage to the blanks of the adjacent pole (English translated abstract).

Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify the rotor by re-configuring the slots so that, instead of being connected to the edges of the magnets, the slots being separated from the first and second edges of the magnet poles by a ridge, and the slots are extending from close to the first and second edges of the pole essentially towards the center of each of the plurality of magnetic poles, as taught by Regis. Doing so would enable the through a maximum of magnetic flux in the vicinity of the plane of symmetry of the pole and to limit the magnetic flux leakage passage to the blanks of the adjacent pole.

Regarding the limitations of the magnet being located on the surface of the outer circumference of the rotor, instead of being within the rotor core as disclosed by Wakui, those skilled in the art would realize that re-arranging the magnets is a matter of obvious engineering design choice.

Wakui's rotor having magnets being embedded in the core, this would ensure that the magnets being mechanically support and protected within the core to prevent magnet breakage. However, such arrangement might cost more in term of fabricating because of the process of forming the inserting holes for accommodating the magnets within.

On the contrary, placing magnet on the outer circumferential surface of the rotor, as claimed in the invention, would enhance the magnetic flux flow since the magnets are directly facing the stator, and reduce cost of fabricating process. However, the mechanical support and protection for the magnets against centrifugal force during the rotor rotation would be compromised. Since the magnets being located on the outer circumferential surface of the rotor, there would be a greater chance that the magnet being broken, and the broken pieces being discard by the centrifugal force causing potential damage to other parts of the machine. Nevertheless, rotors with magnets being located on the outer circumferential surface thereof are well known in the art.

Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify the rotor by re-arranging the rotor so that the magnet being located on the surface of the outer circumference of the rotor. Doing so would enhance the magnetic flux flow since the magnets are directly facing the stator, and reduce cost of fabricating process. Also, such re-arrangement is well known in the art and would require only routine skills in the art.

Regarding the method claimed language, the combination of **Wakui, Asano and Regis** discloses the detailed structural features of the claimed rotor, it would have been obvious to one skilled in the art with the necessary mechanical skills in the art to derive a method of fabricating

the disclosed rotor, as of **Wakui, Asano and Regis,** because method of fabricating of the like is a counterpart of the rotor structure. Furthermore, whether the slots are formed by die cutting or laser for drilling is a matter of obvious machinery fabricating choice, each having its own advantage but all there methods for fabricating slots/holes in a rotor core are well known in the art.

Allowable Subject Matter

Claims 8-9 and 19-20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Communication

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tran N. Nguyen whose telephone number is 571-272-2030. The examiner can normally be reached on 7:00 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren Schuberg can be reached on 571-272-2044. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. (Note: **Use this Central Fax number 571-273-8300 for all official response**.)

Do **not** use the Examiner's RightFax number without informing the Examiner first because, according to the USPTO policy, any document being sent via RightFax is treated as unofficial response and will not be officially dated until it is routed to the Central Fax.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Tran N. Nguyen
Primary Examiner
Art Unit 2834